NARROW BANDWIDTH, PICO-SECOND, OPTICAL PARAMETRIC OSCILLATOR-MASTER OSCILLATOR POWER AMPLIFIER SYSTEM AND METHOD OF OPERATION OF SAME

Abstract of the Disclosure

A synchronously pumped optical parametric oscillator generates pulses with duration 25 ps and repetition rate of 10 Hz. The bandwidth of the radiation is 1.36 cm^{-1}, close to the Fourier limit. A single pulse from each oscillator is further amplified with an optical parametric amplifier obtaining pulse energies up to 3.7 mJ. This source can be tuned between 410 nm - 2000 nm. The system is not a laser but an optical parametric oscillator where amplification is obtained in a parametric process rather than by population inversion. The oscillator is pumped by a pulse train from a Nd:Yag laser. In each roundtrip the bandwidth of the radiation is reduced by a grating-mirror assembly. After a number of roundtrips a close to ideal pulse is obtained. This single pulse is then amplified by an optical parametric amplifier obtaining a single tunable narrow bandwidth pulse with a duration of about 25 ps.